Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands	)	GN Docket No. 13-185
	)	
Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band	)	WT Docket No. 07-195 (Proceeding Terminated)
	)	
Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz, and 2175-2180 MHz Bands	)	WT Docket No. 04-356 (Proceeding Terminated)
	)	
Applications for License and Authority to Operate in the 2155-2175 MHz Band	)	WT Docket No. 07-16 (Proceeding Terminated)
	)	
Petitions for Forbearance Under 47 U.S.C. § 160	)	WT Docket No. 07-30 (Proceeding Terminated)

COMMENTS OF CTIA – THE WIRELESS ASSOCIATION®

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COMMENTS OF CTIA – THE WIRELESS ASSOCIATION®

I. INTRODUCTION AND SUMMARY

CTIA – The Wireless Association® ("CTIA") respectfully submits these comments in response to the Commission's *Notice of Proposed Rulemaking and Order on Reconsideration* ("*NPRM"*) proposing rules for spectrum in the 1695-1710 MHz, 1755-1780 MHz, 2020-2025 MHz, and 2155-2180 MHz bands that would make available significantly more commercial spectrum for Advanced Wireless Services ("AWS").[1]

[1] *Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, Notice of Proposed Rulemaking and Order on Reconsideration, FCC 13-102 (July 23, 2013) ("*NPRM*"). Consistent with the terminology used in the *NPRM*, CTIA refers to the 1695-1710 MHz, 1755-1780 MHz, 2020-2025 MHz, and 2155-2180 MHz bands individually and collectively as "AWS-3." *See NPRM* at n. 1.

In these comments, CTIA urges the Federal Communications Commission ("Commission" or "FCC") to implement the requirements of the Middle Class Tax Relief and Job Creation Act of 2012 ("Spectrum Act") by bringing an additional 80 MHz of paired AWS spectrum to market to meet the surging demand for mobile broadband services. To achieve this goal, the Commission should adopt a logical band plan for the AWS-3 spectrum based on pairings that will provide significant contiguous extensions of the existing AWS band; advance current efforts to reallocate and provide for limited sharing of spectrum in the 1755-1780 MHz band; identify 15 MHz of spectrum within the Commission's purview to be reallocated for mobile broadband use; and adopt technical rules for AWS-3 mobile devices consistent with existing AWS rules.

Key to the successful deployment of this spectrum will be the band plan adopted by the Commission. In these comments, CTIA presents a band plan proposal that makes the most effective pairing and licensing of the targeted spectrum. Specifically, CTIA proposes to pair the 1755-1780 MHz band with the 2155-2180 MHz band and to explore the pairing of the 1695-1710 MHz band with spectrum from the 2095-2110 MHz band. As CTIA explains below, these pairings will help maximize the utility of this spectrum and will complement and build upon existing allocations while meeting the edicts of the Spectrum Act for the Commission to repurpose 15 megahertz of spectrum by February of 2015. However, the Commission also should continue to study other bands, such as the 2020-2025 MHz and 1780-1850 MHz bands, to meet the long-term goals of Congress and the Administration to identify and allocate 500 megahertz of additional spectrum for mobile broadband services.

Because several of the spectrum bands identified in the *NPRM* are currently allocated for Federal use, "commercial access to these bands . . . may require some combination of

reallocation, relocation, sharing, and/or coordination."[2] CTIA's member companies have been extremely active in ongoing discussions with Federal incumbents regarding these bands. The Department of Defense ("DoD") has made a proposal for spectrum sharing and relocation in the 1755-1780 MHz band, which CTIA generally supports. However, additional work needs to be completed to evaluate the DoD plan. CTIA is optimistic that interested stakeholders will continue to build upon the efforts of the Commerce Spectrum Management Advisory Committee ("CSMAC"), and hopes that any requirements adopted by the FCC will be able to take into account future refinements that enhance commercial access to these bands. CTIA supports a framework where the Commission may move forward with licensing these bands while discussions continue between the wireless industry and Federal users. CTIA also notes and supports the proposal to allow Federal access to commercial spectrum through use of the existing secondary market framework.

Finally, CTIA supports the adoption of standard technical rules for the AWS-3 spectrum. The Commission has proposed standard technical rules for the AWS-3 spectrum, with the exception of AWS-3 handset power limits. CTIA believes that the Commission should instead adopt the same overall power limit for AWS-3 mobile devices as is in place for AWS-1 mobiles. Under this framework, AWS-3 mobiles that operate at higher power levels would be subject to more coordination with Federal incumbents, as has been true for AWS-1 mobiles. This will allow wireless providers the flexibility to determine the appropriate power level for their particular implementation.

CTIA agrees with the Commission that this spectrum "will help ensure that the speed, capacity, and ubiquity of the nation's wireless networks keep pace with the skyrocketing demand

[2] *Id.* at ¶ 53.

for mobile service."[3] For the past four years, CTIA has highlighted how rapid innovation by the wireless industry has driven unprecedented demand for mobile services and placed considerable strain on the nation's spectrum resources. The spectrum that is the subject of this proceeding will play an important role in helping to ensure that the wireless industry's unmatched innovation and growth continues for years to come. Congress has mandated that the spectrum identified in this proceeding be auctioned and licensed by February 2015 – a task that is critically important to the ongoing investment and deployment of wireless systems. CTIA supports the Commission's efforts to comply with the Spectrum Act and stresses that the Commission must act swiftly and efficiently if it is to keep pace with the Spectrum Act's requirements.

II. THE SPECTRUM BANDS IDENTIFIED BY THE COMMISSION IN THE NPRM WILL HELP TO ALLEVIATE THE SPECTRUM CRUNCH.

As the Commission has observed, "usage of [America's] wireless networks is skyrocketing, dramatically increasing demands on both licensed and unlicensed spectrum—the invisible infrastructure on which all wireless networks depend."[4] As Chairwoman Clyburn correctly observed, "[m]obile innovation is key to U.S. competitiveness."[5] Indeed, the United States "currently lead[s] the world in LTE deployment, with about as many LTE subscribers as the rest of the world combined. But maintaining this lead will only happen if we address one of the biggest challenges to our mobile future – the demand for spectrum."[6] The spectrum

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3 *Id.* at ¶ 1.

4 *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, Notice of Proposed Rulemaking*, FCC 12-118, ¶ 1 (Sept. 28, 2012) ("*TV Incentive Auctions NPRM*").

5 Prepared Remarks of FCC Acting Chairwoman Mignon L. Clyburn, CTIA 2013 Las Vegas, Nevada (May 21, 2013), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-321114A1.pdf.

6 *Id.*

identified in this proceeding will play a vital role in addressing the spectrum crunch, and the Commission should act quickly to allocate it.

CTIA has been at the forefront of discussing the need for additional spectrum for mobile broadband. CTIA first identified a gathering spectrum storm and looming spectrum crisis in September 2009, when it urged U.S. policymakers to "immediately launch an effort to identify and allocate significant amounts of additional spectrum for commercial wireless services if the U.S. wants mobile providers to continue expanding their wireless networks and services to meet rapidly expanding demand."[7] Through research efforts such as its Semi-Annual Survey, CTIA has produced volumes of data demonstrating the growth of data consumption by wireless subscribers in the U.S. This data demonstrates that the "virtuous cycle" of innovation in the wireless industry is in danger of slowing in the absence of additional spectrum allocations. For this reason, CTIA was a champion of the Spectrum Act and its ambitious spectrum allocation goals.[8] CTIA also has been a major contributor to the Commission's spectrum proceedings, and countless others have echoed CTIA's call for additional spectrum.

Since CTIA initially identified the spectrum crunch in 2009, the wireless industry has undergone several evolutions that have only increased the strain on America's wireless networks. The tablet market did not exist in 2009, but today many tablet devices come equipped with wireless capability, and have been extremely popular with American consumers. As of

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[7] Letter from Christopher Guttman-McCabe to Chairman Julius Genachowski et al, Federal Communications Commission, GN Docket No. 09-51, at 5 (Sept. 29, 2009).

[8] CTIA Statement on the Middle Class Tax Relief and Job Creation Act (Feb. 23, 2012), *available at* http://blog.ctia.org/2012/02/23/ctia-statement-on-the-middle-class-tax-relief-and-job-creation-act/.

December 2012, more than one-fifth of U.S. homes were tablet owners.[9] Commercial wireless networks have also seen an explosion of uses for "vertical" sectors of the economy: mHealth, mobile education, intelligent transportation, smart grid, inventory control, traffic management, and more.[10] America's wireless companies also have made substantial investments in next-generation networks since 2009. The first Long Term Evolution ("LTE") networks were deployed in the United States in 2010, and the growth of these and other advanced generation wireless networks means "that what was once considered only in the realm of desktop computers – or someone's imagination – is now seamlessly mobile."[11] Data from CTIA's Semi-Annual Survey demonstrate the continued growth and popularity of wireless broadband. The Survey revealed that reported wireless traffic in 2012 totaled 1.468 trillion megabytes, a 69.3 percent increase over 2011.[12]

In response to this ever-growing strain on U.S. wireless networks, Congress enacted the Middle Class Tax Relief and Job Creation Act of 2012, legislation that focused on addressing the

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[9] Sarah Perez, "Nielsen: 85 Percent of Tablet and Smartphone Owners Use Devices as 'Second Screen' Monthly, 40 Percent Do So Daily," TechCrunch (Dec. 5, 2012), *available at* http://techcrunch.com/2012/12/05/nielsen-85-percent-of-tablet-and-smartphone-owners-use-devices-as-second-screen-monthly-40-percent-do-so-daily/.

[10] *See, e.g.*, Letter from Christopher Guttman-McCabe, CTIA – The Wireless Association, to Marlene H. Dortch, FCC, GN Docket Nos. 12-268, 09-51; WT Docket No. 11-186 (Jan. 22, 2013) (including links and QR codes to several CTIA videos, each focused on a subject area benefiting from wireless innovation).

[11] Verizon Wireless, In Two Years 4G LTE Has Changed the Mobile Lifestyle (Dec. 5, 2012), *available at* http://news.verizonwireless.com/news/2012/12/verizon-wireless-4G-LTE-two-year-anniversary.html.

[12] News Release, CTIA, "CTIA—The Wireless Association® Semi-Annual Survey Shows U.S. Wireless Providers Invested Almost Six Times More Per Subscriber than Rest of World," (May 2, 2013), *available at* http://ctia.org/media/press/body.cfm/prid/2261.

"spectrum crunch" currently faced by the wireless industry.[13] This landmark legislation tasked the Commission with undertaking several efforts to bring more spectrum for commercial mobile broadband services to market. As the Commission notes in the *NPRM*, the Spectrum Act requires that the Commission grant new initial licenses for four spectrum bands by February 2015: (1) the 2155-2180 MHz band, (2) 15 megahertz between 1675-1710 MHz, (3) up to 10 megahertz at 1915-1920 MHz and 1995-2000 MHz, and (4) an additional contiguous 15 megahertz to be identified by the Commission.[14] Three of these four bands are the subject of this proceeding.[15]

CTIA supports the Commission's efforts to comply with the Spectrum Act and urges the Commission to develop a complete record and take steps to stay on pace with the Spectrum Act's requirements. In a letter filed by CTIA with the Commission and with NTIA last year, CTIA laid out a timeline for the identification and auction of the spectrum identified in the Spectrum Act.[16] CTIA prepared this timeline based on the typical timetable employed by the Commission to: commence a rulemaking, seek comment on service rules, seek comment on auction procedures, conduct an auction, and issue licenses. As CTIA noted then, the Commission will need to act aggressively to meet the deadlines set forth by the Spectrum Act, and CTIA and the

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13 Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156 (2012) ("Spectrum Act").

14 *NPRM* at ¶ 10.

15 The Commission recently adopted an order adopting service rules for the 1915-1920 MHz/1995-2000 MHz "H Block" and this band is slated for near-term auction. *See Service Rules for Advanced Wireless Services H Block*, Report and Order, FCC 13-88 (2013).

16 Letter from Steve Largent, President and CEO, CTIA – The Wireless Association® to FCC Chairman Julius Genachowski et al. (March 22, 2012), *available at* http://files.ctia.org/pdf/CTIA_Letter_to_FCC_Regarding_Implementation_of_Spectrum_Legislation_FINAL_signature.pdf.

wireless industry stand prepared to meet these goals. America's future mobile broadband leadership depends on it.

III. THE COMMISSION MUST ADOPT A LOGICAL BAND PLAN FOR THE AWS-3 SPECTRUM.

As CTIA has noted previously, a logical band plan is essential to a successful and productive allocation of spectrum.[17] The FCC has not proposed a particular band plan for the spectrum to be reallocated in this proceeding. Instead, it has highlighted four bands with no determination of how this spectrum would be licensed. These bands are 2155-2180 MHz, 1695-1710 MHz, 1755-1780 MHz, and 2020-2025 MHz.[18] CTIA believes that the first step for the Commission should be to focus on a holistic band plan that best pairs and licenses spectrum for mobile broadband services. The Commission will need to adopt a band plan that does not disrupt or create interference to existing spectrum allocations, a difficult task given the diversity and intensity of usage in adjacent bands. Similarly, the Commission needs to craft a band plan that will promote the most intensive and efficient use of this spectrum.

As illustrated below, three of the four bands highlighted by the Commission are adjacent to the AWS-1 band, which is composed of uplink spectrum at 1710-1755 MHz and downlink spectrum at 2110-2155 MHz. Any band plan adopted by the Commission should strive to both protect and, where applicable, complement incumbent adjacent services.

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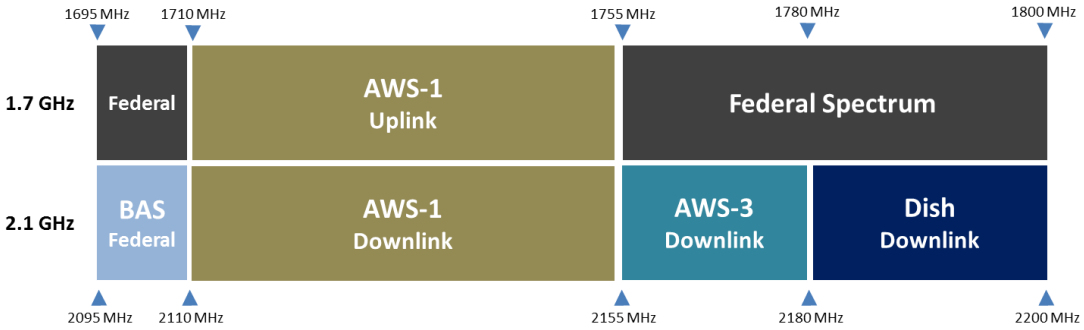
[17] Reply Comments of CTIA – The Wireless Association®, GN Docket No. 12-268, at 14 (Mar. 12, 2013).

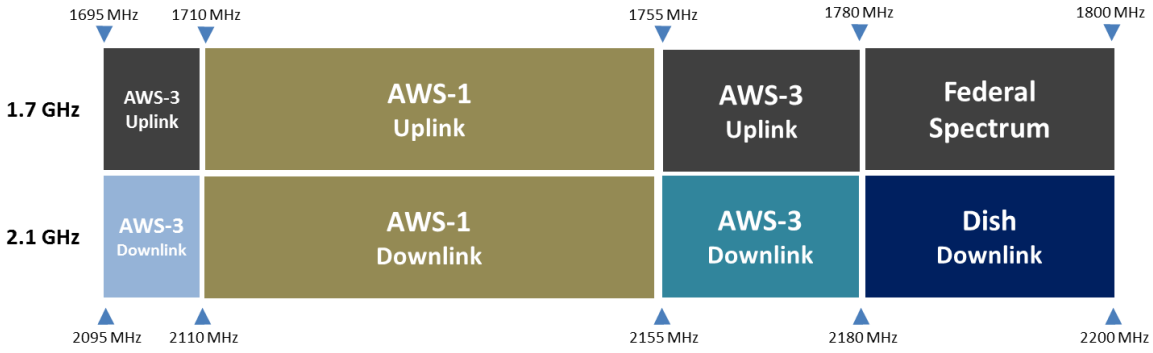
[18] *NPRM* at ¶¶ 29-35.

Advanced Wireless Services (AWS)
Current Allocation



CTIA presents below a band plan proposal that makes the most efficient pairing and licensing of the targeted spectrum for reallocation:

Advanced Wireless Services (AWS)
CTIA Proposal



As detailed above, CTIA's band plan proposal involves the creation of two symmetric spectrum pairings: 1755-1780 MHz/2155-2180 MHz, and 1695-1710 MHz/2095-2110 MHz, both of which would be adjacent to the existing AWS spectrum bands. The adoption of these

pairings would carry several benefits: they would maximize the value of the spectrum involved, they would complement the existing AWS-1 allocation and enable the development of advanced services and devices, and they would not interfere with adjacent operations. This proposal also will allow the Commission to satisfy its Spectrum Act obligations to identify and allocate 15 megahertz of contiguous spectrum, namely the 2095-2110 MHz band. Meanwhile, the Commission should continue to study other bands, such as the 2020-2025 MHz and 1780-1850 MHz bands, with an eye toward making additional spectrum available for mobile broadband.

A. The Commission Should Pair the 2155-2180 MHz and 1755-1780 MHz Bands.

The Commission correctly observed in the *NPRM* that the 1755-1780 MHz band "holds potential as an extension to existing AWS spectrum," that it "has several characteristics that make it especially appealing for commercial wireless use," and that "it could be paired with the 2155-2180 MHz band to symmetrically extend the AWS-1 band."[19] CTIA agrees, and notes many benefits of this pairing and the widespread support for it.

In the National Broadband Plan, the Commission favored a pairing of the 1755-1780 MHz and 2155-2180 MHz bands, noting the "potential synergies" between these bands.[20] As can be seen from the graphic above, AWS-1 spectrum is directly adjacent to this potential pairing, and it would serve as a logical extension of the AWS-1 band. A pairing of these two spectrum bands would continue to build upon the current AWS-1 allocation and allow for the seamless integration of this spectrum for use by mobile broadband providers for wireless services. Indeed, the AWS-1 band is a key spectrum home for LTE services, and adding more

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19 *NPRM* at ¶ 33.

20 Federal Communications Commission, *Connecting America, The National Broadband Plan* at 86-87 (2010) ("National Broadband Plan").

spectrum through a pairing of 1755-1780 MHz/2155-2180 MHz would allow even more robust deployment of LTE. By providing for wider channels, this spectrum would become ideally suited for LTE-Advanced and the innovations and data speeds it enables.

This pairing also is ideal due to its international harmonization potential. The 1710-1885 MHz band has been identified by the International Telecommunications Union ("ITU") for commercial wireless uses.[21] This international harmonization would allow for economies of scope and scale to be brought to bear in the development of this spectrum. As a result, this pairing has the potential to "bring benefits of a global equipment ecosystem to this band."[22] Conversely, the Brattle Group has noted that "[m]any manufacturers are reluctant to develop equipment for non-harmonized band[s] because the demand is inherently limited. It is likely that equipment will be both more expensive, take longer to develop, and have fewer features."[23]

With respect to the 2155-2180 MHz and 1755-1780 MHz bands, a previous study by the Brattle Group demonstrated that pairing these bands would significantly enhance the value of this spectrum. In the study, the Brattle Group evaluated four potential options for the AWS-3 band, finding that a pairing of the AWS-3 spectrum at 2155-2175 MHz with 20 MHz from the 1755 MHz band would result in considerable efficiencies and a valuation of $12 billion for the combined 40 MHz of spectrum.[24] If a 50 MHz pairing was created by adding the 2175-2180

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[21] Reply Comments of CTIA – The Wireless Association® On NBP Public Notice #6, Spectrum for Broadband, GN Docket No. 09-51, at 14 (Nov. 13, 2009).

[22] National Broadband Plan at 86.

[23] The Brattle Group, "The Economic Basis of Spectrum Value: Pairing AWS-3 with the 1755 MHz Band is More Valuable than Pairing it with Frequencies from the 1690 MHz Band" at 12 (Apr. 11, 2011), attached to Letter from Coleman Bazelon, The Brattle Group to Marlene H. Dortch, FCC, ET Docket No. 10-123 (Apr. 11, 2011) ("Brattle Group Paper").

[24] *Id.* at 14.

MHz band to AWS-3 and pairing this band with the 2155-2180 MHz band, the Brattle Group calculated that its value would be approximately 25 percent greater; that is, a valuation of $15 billion.[25] Meanwhile, the other three options considered by the Brattle Group (pairing AWS-3 with the 1690-1710 MHz band, creating an asymmetric pairing between the AWS-3 band and the 1695-1710 MHz band, and leaving AWS-3 unpaired) would significantly diminish the value of the spectrum.[26]

While the Commission's spectrum policy decisions cannot be driven solely by considerations of auction revenue, these findings by the Brattle Group underscore the well-established benefits of this pairing. As the revenues from auction of this spectrum will help support FirstNet deployment and deficit reduction, it is in the public interest to design a band plan that maximizes the value of this spectrum. Indeed, in recent years the wireless industry has consistently advocated for this pairing. This support is driven by the findings of technical experts regarding the utility of this pairing and the innovative technologies it would enable. As such, pairing the 2155-2180 MHz and 1755-1780 MHz bands is clearly in the public interest.

B. The Commission Should Explore Pairing the 1695-1710 MHz Band With the 2095-2110 MHz Band.

The *NPRM* does not present any firm conclusion on how the 1695-1710 MHz band should be paired with additional spectrum.[27] As can be seen from the spectrum band plan graphic above, the 1695-1710 MHz band is directly adjacent to the lower end of the AWS-1 band. To maintain the same duplex spacing, the logical spectrum pair for the 1695-1710 MHz band would be 2095-2110 MHz. This pairing, along with the 1755-1780/2155-2180 MHz

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25 *Id.* at 11.

26 *Id.* at 22.

27 *NPRM* at ¶ 31.

pairing highlighted above, would create a substantial AWS paired spectrum band: 85 MHz by 85 MHz for a total of 170 MHz of paired spectrum. This band could be readily integrated with existing wireless AWS-1 systems.

1. The 1695-1710/2095-2110 MHz Pairing Is Best Positioned To Meet The Spectrum Requirements for Commercial Mobile Broadband Providers.

In a previous filing, CTIA highlighted a potential pairing of the 1695-1710 MHz band with the 15 megahertz of spectrum at 2095-2110 MHz.[28] As CTIA noted then, it is not aware of any other spectrum bands as well-positioned as this band to meet all of the key principles for mobile broadband spectrum: it lies below 3 gigahertz; it will enable the development of large, contiguous blocks; it is adjacent to another mobile broadband allocation, and it would be part of a symmetric pair.[29] Due to these significant benefits, CTIA urges the Commission to give strong consideration to reallocating the 2095-2110 MHz band and pairing it with the 1695-1710 MHz band. This would also satisfy the Commission's statutory obligation to identify and allocate an additional 15 megahertz of contiguous spectrum for mobile broadband, discussed further in section III.D. below.

While the 2095-2110 MHz band is the most logical choice for new mobile broadband services and for pairing with the 1695-1710 MHz band, there are incumbent users of this spectrum. The Broadcast Auxiliary Service ("BAS") currently uses the 2095-2110 MHz band to relay aural and television signals. BAS stations can be used to relay signals from the studio to the transmitter, or between two points. BAS also includes mobile TV pickups and remote pickup

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[28] Letter from Steve Largent, President, CTIA, to Julius Genachowski, Chairman, FCC, GN Docket No. 09-51 (March 13, 2013) ("CTIA 15 MHz Letter") (attaching "Finding the FCC's 15 MHz Implementation of Section 6401(b)(2)(E) of the Middle Class Tax Relief and Job Creation Act of 2012 – Identification of 15 Megahertz of Contiguous Spectrum for Mobile Broadband") ("CTIA 15 MHz White Paper").

[29] CTIA 15 MHz White Paper at 12.

stations which relay signals from a remote location back to the studio. The BAS band is divided into seven channels, each of which is 12 MHz wide. In addition to hosting BAS, the 2025-2110 MHz band is also home to the Federal space operation service, earth exploration-satellite service, and space research service.[30] There are currently 11 locations in the United States where Federal satellite earth stations are permitted to operate on a co-primary basis with non-Federal operations.[31] The Department of Defense also has indicated interest in expanded access to this spectrum in return for exiting the 1755-1780 MHz band.[32]

While broadcaster and Federal incumbents are utilizing the 2095-2110 MHz band, CTIA urges the Commission to begin a process to address impediments to making the 2095-2110 MHz band available for commercial mobile use. Given the intensive use of spectrum below 3 GHz, there are no simple or straightforward reallocations that can occur without relocation and compensation for existing incumbent users – something the Commission is well prepared to handle and has successfully managed for the past 20 years. Areas of additional exploration for the 2095-2110 MHz band include determination of the need for BAS to occupy the entire 2025-2110 MHz band, the technical alternatives available in the market place for BAS-type services and the ability of existing Federal operations to share access in the 2095-2110 MHz portion of the 2025-2110 MHz band. CTIA addresses each of these areas in detail below.

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30 47 C.F.R. 2.106, n. US346.

31 *Id.*

32 *NPRM* at ¶ 79.

2. BAS Spectrum Requirements in the 2025-2110 MHz Band.

As the Commission is aware, BAS licensees have recently completed a conversion from analog to digital services, primarily through coordination with Sprint.[33] Prior to this transition, BAS licensees used 17 MHz-wide channels to deliver video services using analog technology. Due to the transition to digital, these exact same video feeds were able to be provided in 12 MHz-wide channels – allowing the repurposing of 35 MHz of spectrum from BAS to other services.[34] While this transition has been only recently completed, given the need for effective and efficient use of all spectrum resources, CTIA believes that an investigation of the need for 12 MHz for each video channel should be explored. Current broadcast television standards only require 6 MHz of bandwidth to deliver HDTV – or half the amount that is set aside for BAS feeds. Moreover, given the ongoing development of technology, it is not even clear that 6 MHz would be necessary using current broadcast television standards.[35] Given the critical nature of identifying more spectrum for commercial mobile broadband services, CTIA would urge the Commission to take a fresh look at the spectrum requirements for BAS.

In addition to investigation of modified, more efficient technology, CTIA also notes that there has been extensive use of alternatives for providing BAS-type communications. Use of

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33 *Improving Public Safety Communications in the 800 MHz Band*, Fifth Report and Order, Eleventh Report and Order, Sixth Report and Order, and Declaratory Ruling, 25 FCC Rcd 13874, ¶ 1 (2010).

34 *Id.* at ¶ 4 ("In 2000, the Commission determined that BAS licensees in the 1990-2110 MHz band could, through the use of new digital equipment, operate wholly within the smaller 2025-2110 MHz band. New licensees would then be able to use the 1990-2025 MHz band to provide new and innovative services to the public.").

35 For example, the DVB-T2 standard that was approved in 2008 and has been deployed in Europe (among other countries) can use bandwidths of 1.7 MHz, 5 MHz, 6 MHz, 7 MHz, 8 MHz and 10 MHz to deliver high quality broadcast television content. *See e.g.*, http://en.wikipedia.org/wiki/DVB-T2#Technical_details (last visited September 13, 2013).

Skype has sky-rocketed in the past several years, to the point that its use is common at both the national and local level.[36] JVC and other equipment manufacturers have developed hand-held camcorders that rely upon 3G/LTE and WiFi to backhaul electronic news gathering ("ENG") from remote reporting sites.[37] While each of these new technology alternatives may not fully replace the existing capabilities for broadcasters in the 2025-2110 MHz band, CTIA believes that the Commission should independently review whether these new options mitigate the overall demand for all 85 megahertz for BAS.

3. Federal Spectrum Requirements in the 2025-2110 MHz Band.

As noted above, Federal agencies also utilize the 2025-2110 MHz band and have requested additional access to this spectrum to help with relocation of Federal operations in the 1755-1780 MHz band. CTIA believes that the Commission must investigate the ability for Federal entities to share the 2095-2110 MHz band with commercial broadband licensees as well as the need for Federal access to the entire 2025-2110 MHz band.

a. The Commission must review and update the Federal analysis associated with sharing the 2095-2110 MHz band.

As the Commission notes in the *NPRM*, NASA has prepared a Feasibility Assessment in which it concluded that LTE and NASA operations could not co-exist in this band.[38] Specifically, NASA concluded that sharing is not feasible due to excessive interference

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[36] *See e.g.*, http://blogs.skype.com/2010/10/18/in-less-than-two-years/ (last visited September 13, 2013).

[37] *See* http://www.sportsvideo.org/nab2013/latest-news/2013/04/23/jvc-gy-hm650-2-0-prohd-mobile-news-camera-receives-several-accolades-at-nab/ (last visited September 13, 2013).

[38] *Id.* at ¶ 21. *See* Letter from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA, to Julius P. Knapp, Chief, Office of Engineering and Technology, FCC, GN Docket No. 09-51, at 1-2 (July 22, 2013), Enclosure 2 (United States of America, *Feasibility Assessment for Accommodation of Mobile Broadband Long Term Evolution (LTE) Systems in the 2025-2110 MHz Band*, Document 4-5-6-7/170-E (July 16, 2013) ("NASA Study").

generated by LTE systems to the Tracking and Delay Relay Satellite System ("TDRSS") links.[39] This study appears to rely upon many of the worst-case, conservative assumptions that the Department of Defense is currently using in the ongoing CSMAC working group process. In particular, the CSMAC model (and the NASA analysis replicates the same errors) assumes a far greater number of LTE base stations, a more equal distribution of these base stations, and a higher overall power level than would be present in a real-world deployment. NASA also studied both uplink and downlink use of the 2095-2110 MHz band even though the industry focus is on downlink only for this band.[40] Further, if the assumptions made in NASA's analysis were correct, there would today be observable interference caused by AWS-1 base stations to TDRSS satellite operations at the 2109.49 MHz frequency,[41] and no such complaints of interference have been made. CTIA believes that the Commission must revisit this NASA study to modify the assumptions made to more accurately depict the real-world interference environment. The Commission should encourage the wireless industry and NASA to collaborate with one another to conduct a review of NASA's study and ask NASA to share its simulation tool with the industry. CTIA is hopeful that such a collaborative approach will enable interested parties to reach an agreement that would permit commercial wireless operations in the 2095-2110 MHz band.

b. The Department of Defense request for additional access to the 2025-2110 MHz band requires additional detail and study.

With respect to the Department of Defense's request for access to the 2025-2110 MHz band, CTIA submits that the DoD has not adequately explained and justified its need for access

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39 *Id.* § 6.

40 *Id.* §§ 4.1, 4.2.

41 *Id.* at Table 1.

to the entirety of the 2025-2110 MHz band. Indeed, the DoD has not provided the details surrounding its need for access to the entire 2025-2110 MHz band. CTIA also notes that the DoD will be retaining some operations in the 1755-1780 MHz band and, therefore, its need for additional spectrum should be reduced by that fact. Even if DoD were fully exiting the 1755-1780 MHz band, however, it is unclear why it would need to replace operations in 25 megahertz of spectrum with access to 85 megahertz of spectrum. CTIA submits that DoD should provide additional detail in support of its need for more than 25 megahertz of spectrum to replace the partial 1755-1780 MHz access that it would be surrendering.

In light of the issues outlined above, CTIA encourages the Commission to fully investigate the ability of accommodating both BAS and Federal operations in the 2025-2095 MHz band, which would free up the 2095-2110 MHz band for use by commercial wireless networks. Alternatively, additional analysis of sharing in the 2095-2110 MHz spectrum between incumbents and new commercial wireless licensees should be completed. This would facilitate the creation of a spectrum pairing that would hold tremendous benefits for America's wireless consumers.

C. The Commission Should Continue to Study the 2020-2025 MHz and 1780-1850 MHz Bands.

In the *NPRM*, the Commission highlights two additional bands that warrant further study: the 2020-2025 MHz and 1780-1850 MHz bands.[42] As the Commission observed, the 2020-2025 MHz band is currently allocated for non-Federal fixed and mobile services, and the FCC has proposed uplink use of this band under rules similar to those in place for AWS-4 services.[43]

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[42] *NPRM* at ¶¶ 35, 37.

[43] *Id.* at ¶ 35. The Commission's consideration of these bands will necessarily take into account DISH Network Corporation's Petition for Waiver requesting flexibility to place uplink

Meanwhile, the 1780-1850 MHz band is allocated to the fixed and mobile services on a primary basis for Federal use and is assigned to a wide range of military and other government uses.[44] Notwithstanding the challenges posed by adjacent operations to the 2020-2025 MHz and 1780-1850 MHz, the Commission should continue its study of these bands.

1. The 2020-2025 MHz Band.

The 2020-2025 MHz band is adjacent to the AWS-4 uplink band at 2000-2020 MHz and BAS/DoD/NASA uses in the 2025-2110 MHz band. These adjacent uses create challenges with respect to the allocation of this spectrum for mobile broadband. As the Commission has acknowledged, any rules adopted for the 2020-2025 MHz band will need to take into account these adjacent services and whether the band can be allocated in a productive, non-interfering manner.[45]

2. The 1780-1850 MHz Band.

As for the 1780-1850 MHz band, this spectrum is adjacent to the uplink spectrum for AWS-3 and the uplink spectrum used by Broadband PCS services at 1850-1910 MHz. The Federal government is using this spectrum, and the CSMAC working group process has highlighted the technical issues associated with sharing of this spectrum between commercial and governmental entities. In April 2013, CTIA, together with key technology officials from wireless carriers and standards-setting organizations, filed a letter with NTIA highlighting the fact that the 1755-1780 MHz band is "uniquely valuable" and should be given top priority. CTIA and the other signatories noted that the remaining 70 MHz – 1780-1850 MHz – has less value to

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operations in its 2000-2020 MHz spectrum, as it is likely to impact the ultimate classification of the 2020-2025 MHz band.

[44] *Id.* at ¶ 37.

[45] *Id.* at ¶¶ 92-93.

the wireless industry as a standalone band, particularly if brought to market as an unpaired uplink band.[46] As the signatories noted then, because the 1780-1850 MHz frequencies are situated between PCS and AWS uplink bands, this band is more suitable for uplink than downlink operations. Without downlink spectrum available to pair with it, the 1780-1850 MHz band is significantly less valuable to the wireless industry at this time.[47]

CTIA believes that sharing and/or relocation studies for the 1780-1850 MHz band should continue in accordance with Federal requirements and should take into account the long term evolution of available technology. Meanwhile, the near-term focus should be on the 1755-1780 MHz band. The extended timeline for the 1780-1850 MHz spectrum would allow Federal agencies to continue to have access to this spectrum while discussions continue.

D. The Spectrum Act Requires the Commission to Reallocate an Additional 15 Megahertz of Spectrum *Within Commission Purview* for Mobile Broadband Services.

In addition, the Commission in the *NPRM* acknowledges the Spectrum Act's requirement that it identify an additional 15 megahertz of contiguous spectrum for commercial use by February 2015.[48] CTIA previously has submitted that the 2095-2110 MHz band is the most appropriate choice to fulfill this statutory requirement.[49] The Spectrum Act also had mandated

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46 Letter from Kris Rinne, Network Technologies SVP, AT&T Mobility et al to The Honorable Lawrence E. Strickling, Assistant Secretary, Communications and Information, U.S. Department of Commerce (Apr. 24, 2013), *available at* http://www.4gamericas.org/documents/Letter%20on%201755-1780%20MHz%20band%20final%204-24.pdf.

47 *Id.*

48 *NPRM* at ¶ 36, Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156, § 6401(b)(2)(E) (2012) ("Spectrum Act").

49 *See* Section III.B. above.

that NTIA identify 15 megahertz of spectrum for commercial use, and NTIA's selection (the 1695-1710 MHz band) is a logical pairing for 2095-2110 MHz for the reasons discussed above.[50]

CTIA is concerned by the Commission's implication in the *NPRM* that the 1755-1780 MHz band could serve as an appropriate candidate to fulfill the Spectrum Act's "15 megahertz" mandate.[51] CTIA stresses that the Commission may not satisfy this requirement through the allocation of the 1755-1780 MHz band. The legislative history of the Spectrum Act makes clear that Congress intended for the Commission to identify 15 megahertz *in addition to* the 1755-1780 MHz band. For example, the bill passed by the House on December 13, 2011 contained the requirement that the Commission identify 15 megahertz of contiguous spectrum as well as the 1755-1780 MHz band if technically feasible.[52] Therefore, Congress intended for the Commission to find 15 megahertz of spectrum within the FCC's own purview to reallocate, and the Commission cannot use the reallocation of the 1755-1780 MHz band to satisfy this requirement. Indeed, NTIA has fulfilled its statutory requirements by identifying the 1695-1710 MHz spectrum from its spectrum allocations – the Commission is bound by the law to similarly identify and reallocate spectrum under its control.

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[50] Notably, a previous version of the Spectrum Act passed by the House on December 13, 2011 stipulated that the 15 megahertz identified by NTIA was to be paired with the 15 megahertz identified by the FCC. H.R. 3630, 112th Cong. § 4101 (b)(2)(D) (2011) (as passed by the House, December 13, 2011)

[51] *NPRM* at ¶ 36 ("We seek comment on an appropriate candidate for that choice, including, for example, the 1755-1780 MHz band identified above.").

[52] H.R. 3630, 112th Cong. §§ 4101(a)(2)(A), (b)(2) (2011) (as passed by the House, December 13, 2011) (requiring the Commission to auction "[t]he frequencies between 1755 megahertz and 1780 megahertz" if feasible as well as "15 megahertz of contiguous spectrum to be identified by the Commission.").

IV. SUCCESSFUL FEDERAL SHARING AND COORDINATION WILL REQUIRE ADDITIONAL WORK FROM ALL INTERESTED PARTIES.

The Commission correctly stated in the *NPRM* that because current Federal bands are involved in this proceeding, "enabling commercial access to these bands, if clearing is not practicable, may require some combination of reallocation, relocation, sharing, and/or coordination."[53] CTIA commends the efforts of its wireless industry members and Federal government incumbents who, as part of the CSMAC, have worked tirelessly to determine potential sharing and reallocation scenarios for the 1755-1780 MHz band. CTIA submits that much work remains to be done, and that any mechanism for Federal sharing and coordination should be sufficiently flexible to incorporate any additional progress that is made.

On July 22, 2013, NTIA submitted to the Commission a letter from the DoD outlining a proposal for making the 1755-1780 MHz band available for auction and licensing in the near term, while protecting critical DoD capabilities and preserving the necessary flexibility to address the long-term status of the 1780-1850 MHz portion of the band.[54] This proposal included a request for shared access to the 2025-2110 MHz band, modification of select systems to operate in the 1780-1850 MHz and 2025-2110 MHz bands, and sharing of certain services with commercial users in the 1755-1780 MHz band while compressing remaining operations into the 1780-1850 MHz band.[55] CTIA is generally supportive of the DoD's proposal for spectrum relocation and sharing in the 1755-1780 MHz band. However, as noted above, CTIA believes that this plan presents certain complexities and challenges that will require further effort from all interested stakeholders.

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53 *NPRM* at ¶ 53.

54 *NPRM* at ¶ 79.

55 *Id.*

CTIA believes that, given the intricacies of sharing the 2025-2110 MHz band with Federal operations, Federal access should be limited to only that spectrum necessary to conduct operations. The DoD has previously stated that if it is to relocate its systems, it requires "comparable spectrum," described as having "the physical properties to support the mission currently being performed."[56] In particular, the DoD relies on a statutory note to the National Defense Authorization Act for Fiscal Year 2000 stating that the DoD is not obligated to surrender use of a frequency band until it is supplied with an alternative band that "provides comparable technical characteristics to restore essential military capability that will be lost as a result of the band of frequencies to be so surrendered."[57] From the legislative history of this provision, it is evident that Congress' primary concern was that replacement spectrum "not degrade essential military capability."[58] In this instance, however, the DoD seeks to exchange a 25 MHz allocation for an 85 MHz allocation with no explanation of why the DoD would require 60 additional megahertz to maintain the integrity of existing services. Absent such a showing,

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56 Statement of Major General Robert E. Wheeler, Department of Defense Deputy Chief Information Officer for Command, Control, Communications and Computers (C4) and Information Infrastructure (DCIO for C4IIC) before the House Committee on Energy and Commerce Subcommittee on Communications and Technology, "Creating Opportunities through Improved Government Spectrum Efficiency" at 3-4 (Sept. 13, 2012) ("Wheeler Statement") ("The last requirement is comparable spectrum to relocate systems into; this spectrum must have the physical properties to support the mission currently being performed.").

57 *See* Wheeler Statement at Attachment 1, citing Pub. L. 106-65; 47 U.S.C. § 921 (Historical and Statutory Notes).

58 S. REP. NO. 106-301, at 802-803 (1999) (Conf. Rep.) ("Alternative frequencies, with the necessary comparable technical characteristics, would have to be identified and made available to the DOD, if necessary, to restore the essential military capability that will be lost as a result of the surrender of the original spectrum. Essential military capability is that capability provided by the use or planned use of that portion of the spectrum, as of the date of the proposed allocation.").

the exchange proposed by the DoD is not a comparable trade and warrants considerable scrutiny given the national spectrum shortage.

In the *NPRM*, the Commission notes the efforts of the CSMAC working groups and seeks comment on appropriate sharing arrangements based on these groups' findings.[59] CTIA does not fully support the "sharing" studies provided thus far in the CSMAC process and believes that additional work can and should be done to allow for more commercial usage in this band. As CTIA noted above, and as the majority of the CSMAC agreed, "the analysis performed in each of these working groups was both conservative and limited" and as such these engineering analyses do not provide an accurate picture of a potential sharing framework in the studied bands.[60] Further, "because only limited technical data was shared about Federal systems with the working groups, participants were not able to fully engage in the type of informed discussion of the analysis and underlying assumptions necessary to verify the accuracy of the information."[61] However, these CSMAC members "believe that the process recently initiated to allow the release of more Federal system technical characteristics to parties signing non-disclosure agreements will better involve the commercial parties to understand what can be done to better model an analysis of real-world effects."[62]

CTIA notes that Federal agencies' transition plans will be developed based on CSMAC efforts, and therefore there should be a process in place to refine these transition plans prior to

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59 *NPRM* at ¶ 73.

60 Separate Statement Concerning Working Group Reports For the 1755-1780 MHz Band (August 29, 2013), *available at* http://www.ntia.doc.gov/other-publication/2013/separate-statement-concerning-working-group-reports-1755-1850-mhz-band.

61 *Id.*

62 *Id.*

the auction. CTIA also agrees that additional work should continue to better refine the CSMAC's analyses, especially with respect to transitional sharing of the 1755-1780 MHz band and sharing/relocation of the 1780-1850 MHz spectrum.

CTIA recognizes that time is of the essence, and that it may be necessary for these efforts to run in parallel with the Commission's reallocation and licensing of these bands. CTIA supports moving forward with licensing the 1695-1710 MHz and 1755-1780 MHz bands with an understanding that these efforts will continue and that eventual commercial licensees can continue to work toward obtaining greater use of the 1695-1710 MHz and 1755-1780 MHz bands in the future.

V. EXISTING SECONDARY MARKET MECHANISMS SHOULD BE USED TO ENABLE FEDERAL ACCESS TO SPECTRUM THROUGH SHARING.

The Commission has asked how Federal users may be accommodated in commercial bands such as the 2155-2180 MHz band.[63] In particular, the Commission notes the potential of "commercial-off-the-shelf" technologies to support important government missions, including military uses.[64] CTIA believes that these technologies hold great promise and warrant greater examination. Moreover, the existing secondary markets framework established by the FCC could be readily modified to allow such agreements to be reached between commercial licensees and Federal entities. CTIA would support use of voluntary secondary market agreements (spectrum leasing agreements) as a way to potentially allow access to spectrum for Federal entities.

Key to successfully reaching these voluntary secondary market agreements will be reaching agreement on mutually beneficial sharing conditions. The ongoing CSMAC process

63 NPRM at ¶¶ 80-82.

64 *Id.* at ¶ 81.

has demonstrated the challenges faced by Federal and commercial wireless operators in conducting productive discussions on sharing parameters. CTIA is optimistic that through increased information sharing, parties may be able to take advantage of the secondary market framework to enable Federal access to spectrum through sharing.

VI. CTIA SUPPORTS MODIFYING THE PROPOSED TECHNICAL RULES FOR AWS-3 MOBILE DEVICES.

In general, the Commission has proposed its standard technical rules for the AWS-3 spectrum to be reallocated and licensed.[65] One exception, however, is the power limit for mobile devices operating in the AWS-3 band: the Commission has proposed an EIRP power limit of 20 dBm for mobiles.[66] CTIA believes that there is no basis for limiting mobile device EIRP in this fashion. Instead, the Commission should look to the technical power limits for mobile devices in the AWS-1 rules for guidance on how to develop power limits for the AWS-3 band.

AWS-1 mobiles are permitted to operate up to 1 watt EIRP.[67] However, AWS-1 mobiles operating with an EIRP of greater than 100 milliwatts (20 dBm) are subject to additional coordination requirements to protect incumbent Federal operations.[68] Handsets transmitting at a power or antenna height above this threshold must coordinate at a greater distance.[69] This framework provides wireless network operators with the flexibility to determine the appropriate power levels for a particular implementation. CTIA urges the Commission to adopt a similar framework for the AWS-3 band, allowing a maximum EIRP of 1 watt for AWS-3 mobiles along

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65 *Id.* at ¶ 85.

66 *Id.* at ¶¶ 102-103.

67 47 C.F.R. § 27.50(d)(4).

68 47 C.F.R. § 27.1134(a)(3).

69 *Id.*

with added coordination obligations as necessary, as this will provide carriers with important flexibility to deploy their systems to optimize performance.

VII. CONCLUSION

CTIA commends the Commission for initiating this critical proceeding and for taking important steps to implement the requirements of the Spectrum Act. The AWS-3 bands, when allocated, will play a valuable role in continuing the cycle of mobile innovation in the U.S. CTIA encourages the Commission to allocate this spectrum in a manner that allows it to achieve its full potential. The Commission should also encourage ongoing discussions between commercial and Federal stakeholders to develop a productive realignment of this spectrum for all parties.

Respectfully submitted,

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